Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A downhole clock source, comprising:

a first crystal and a second crystal, wherein the first and second crystals are thermally coupled together;

~~an~~ a first oscillator coupled to the first ~~and second crystals~~crystal, and a second oscillator coupled to the second crystal, wherein the first oscillator generates a first signal associated with the first crystal, and the second oscillator generates a second signal associated with the second crystal, each of the signals having a frequency, wherein the frequency of the first signal is more stable, with respect to a temperature of the crystals, than the frequency of the second signal;

a mixer coupled to the ~~oscillator~~first and second oscillators, wherein the mixer generates a difference signal representing the difference between the first and second signals as the temperature varies; and

a spectrum analyzer coupled to the mixer, wherein the spectrum analyzer provides a spectral analysis of the difference signal.

2. (Currently Amended) The downhole clock source of claim 1, further comprising a temperature calculation circuit coupled to the first and second oscillators~~oscillator~~, and wherein the temperature calculation circuit determines the temperature of the crystals based on a relationship between the frequency of the first signal and the frequency of the second signal.

3. (Original) The downhole clock source of claim 2, wherein the temperature calculation circuit further comprises a storage device, wherein a frequency behavior of the first and second signals with respect to temperature is stored in the storage device.

4. (Original) The downhole clock source of claim 3, wherein frequency behavior with respect to temperature is stored prior to deployment downhole.

5. (Original) The downhole clock source of claim 2, wherein the frequency of the first signal is temperature compensated according to the temperature of the crystals.

6. (Original) The downhole clock source of claim 5, further comprising a counter coupled to the first oscillator, wherein the counter may be adjusted using information from the storage device to produce a clock signal having a predetermined period regardless of temperature of the crystals.

7. – 31. (Cancelled).

32. (Previously Amended) A method comprising:

thermally coupling a first crystal and a second crystal;

generating a first signal based on a frequency of oscillation of the first crystal;

generating a second signal based on a frequency of oscillation of the second crystal, wherein the first signal's frequency is more stable, with respect to temperature, than the second signal's frequency;

determining a temperature of the first and second crystals based on a relationship between a frequency behavior of the second crystal with respect to temperature;

mixing the first and second signal to produce a sum signal and a difference signal;

filtering out the sum signal;

analyzing, spectrally, the difference signal; and

wherein the spectral content of the difference signal is proportional to the temperature of the crystals.

33. (Cancelled).

34. (Previously Amended) The method of claim 32, further comprising storing an indication of the frequency behavior of the first and second crystals with respect to temperature in a storage device.

35. (Original) The method of claim 34, wherein the storing occurs prior to deployment downhole.

36. (Previously Amended) The method of claim 32, further comprising compensating the first signal's frequency according to the temperature of the crystals.

37. (Cancelled).

38. (Previously Amended) The method of claim 32, further comprising maintaining the temperature of the crystals within a range of predetermined temperatures.

39. (Original) The method of claim 38, wherein maintaining the temperature of the crystals further comprises maintaining the temperature of the crystals within a range of temperatures over which the first signal's frequency is substantially stable with respect to temperature.

40. (Previously Amended) The method of claim 32, further comprising:

maintaining a first count value proportional to the first signal's frequency;

maintaining a first count value proportional to the second signal's frequency;

calculating a ratio of the first and second count value, wherein the ratio of the first and second count values is proportional to the temperature of the crystals.

41. (Previously Amended) The method of claim 32, further comprising:

maintaining a count value with a single counter;

incrementing the count value proportional to the first signal's frequency;

decrementing the count value proportional to the second signal's frequency; and

wherein the net count value is proportional to the temperature of the crystals.

42. (Previously Amended) The method of claim 32, further comprising:

maintaining a count value with a single counter;

decrementing the count value proportional to the first signal's frequency;

incrementing the count value proportional to the second signal's frequency; and

wherein the net count value is proportional to the temperature of the crystals.

43 - 55 (Cancelled).

56. (Previously Amended) A method comprising:

determining an operating temperature of a first crystal based on a difference in frequency between a signal generated based on the first crystal and a signal generated based on a second crystal that is thermally coupled to the first crystal;

generating a first signal based on a frequency of oscillation of the first crystal;

generating a second signal based on a frequency of oscillation of the second crystal, wherein the first signal's frequency is more stable, with respect to temperature, than the second signal's frequency;

mixing the first and second signal to produce a sum signal and a difference signal;

filtering out the sum signal; and

analyzing, spectrally, the difference signal;

wherein the spectral content of the difference signal is proportional to the temperature of the crystals.

57. (Original) The method as defined in claim 56, further comprising adjusting a clock signal generated based on the first crystal for frequency variations of the first crystal related to the operating temperature.

58. (Cancelled).

59. (Previously Amended) The method of claim 56, further comprising:

maintaining a first count value proportional to the first signal's frequency;

maintaining a first count value proportional to the second signal's frequency;

calculating a ratio of the first and second count value, wherein the ratio of the first and second count values is proportional to the temperature of the crystals.

60. (Previously Amended) A method comprising:

determining an operating temperature of a first crystal based on a difference in frequency between a signal generated based on the first crystal and a signal generated based on a second crystal that is thermally coupled to the first crystal;

further comprising:

maintaining a count value with a single counter;

incrementing the count value proportional to the first signal's frequency;

decrementing the count value proportional to the second signal's frequency; and

wherein the net count value is proportional to the temperature of the crystals.

61. (Previously Amended) A method comprising:

determining an operating temperature of a first crystal based on a difference in frequency between a signal generated based on the first crystal and a signal generated based on a second crystal that is thermally coupled to the first crystal;

further comprising:

maintaining a count value with a single counter;

decrementing the count value proportional to the first signal's frequency;

incrementing the count value proportional to the second signal's frequency; and

wherein the net count value is proportional to the temperature of the crystals.

62. (Cancelled).